



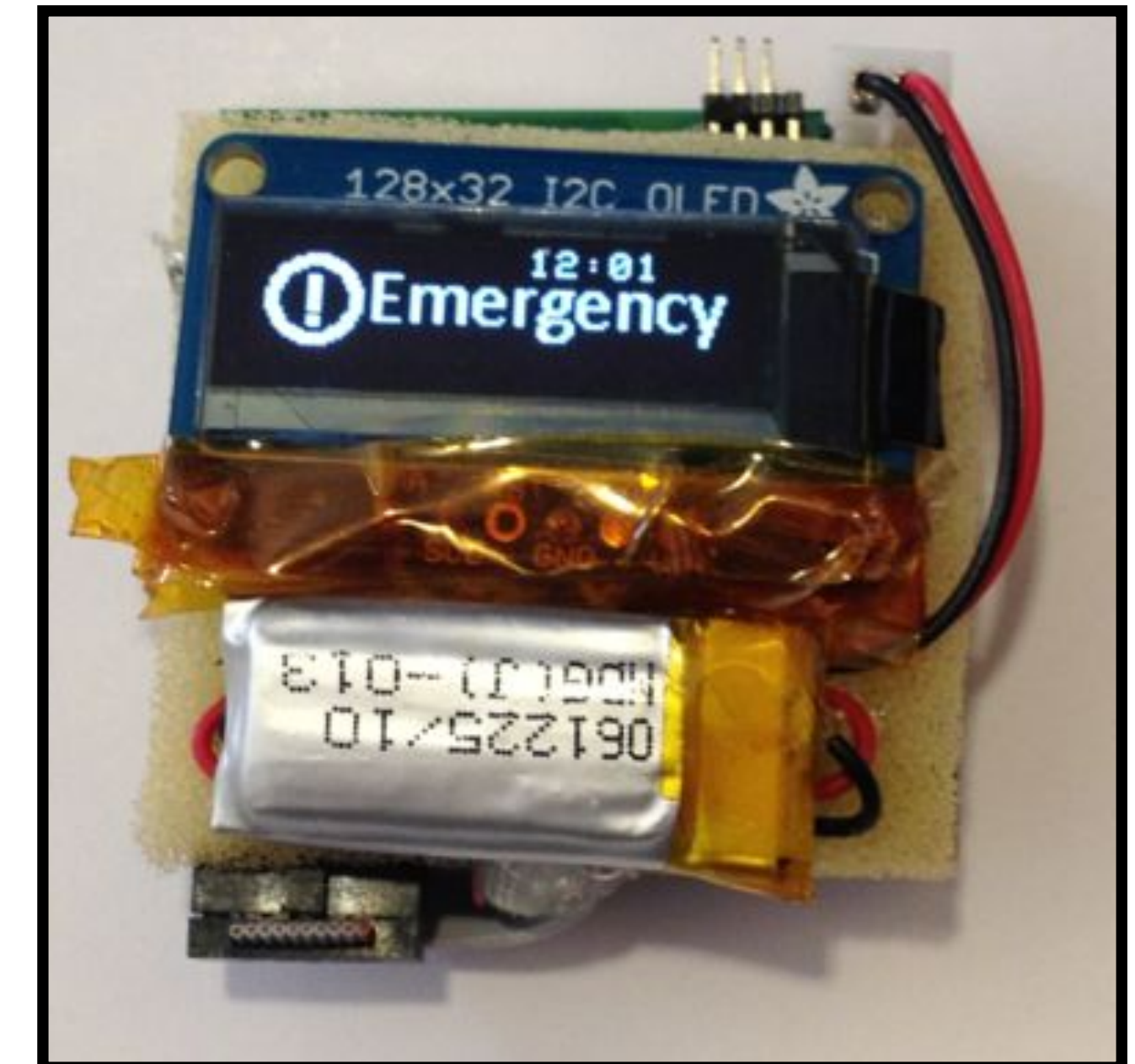
## Amulet: Computational jewelry for mobile health applications

### Consistently present and available body-area mHealth networks

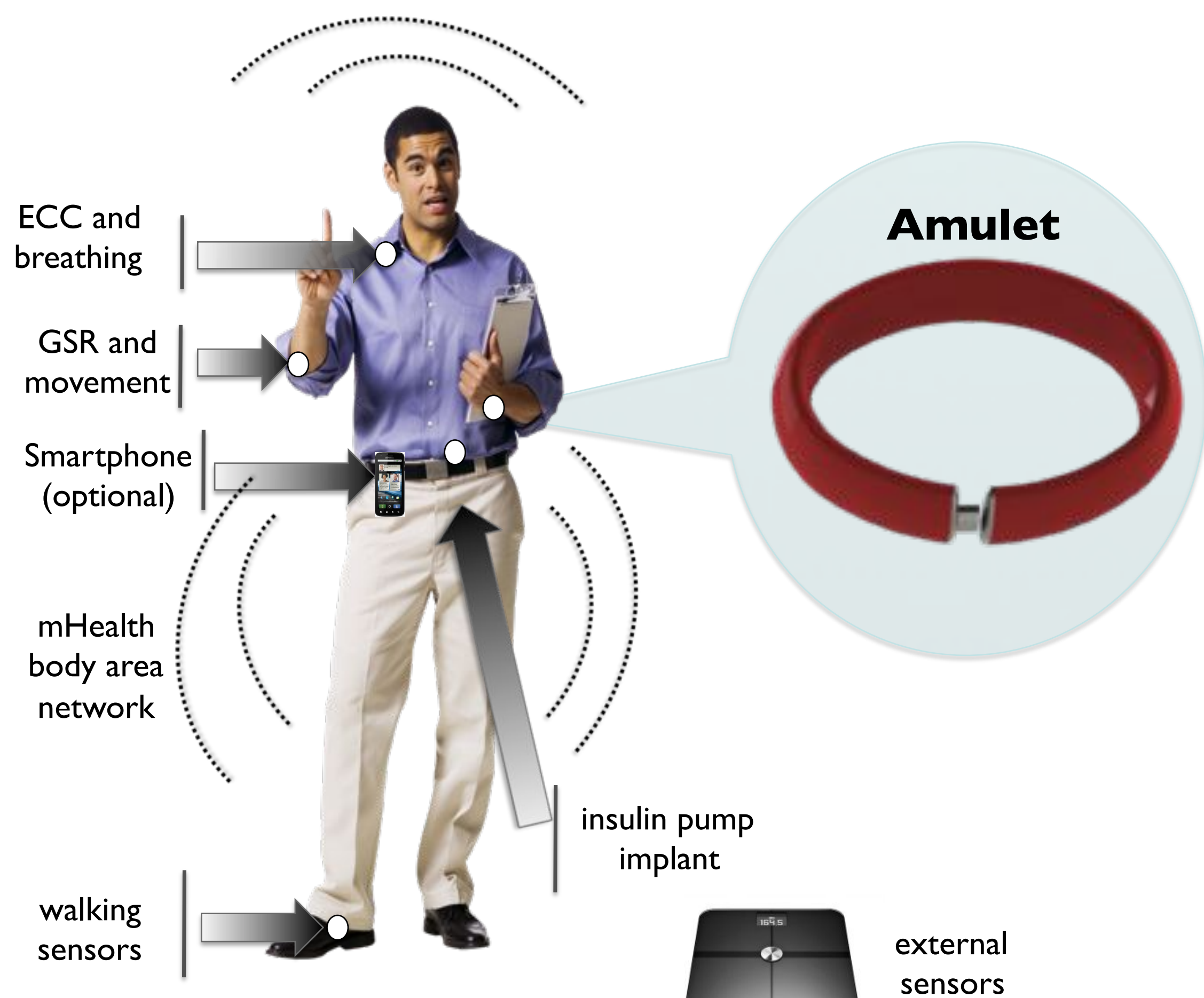
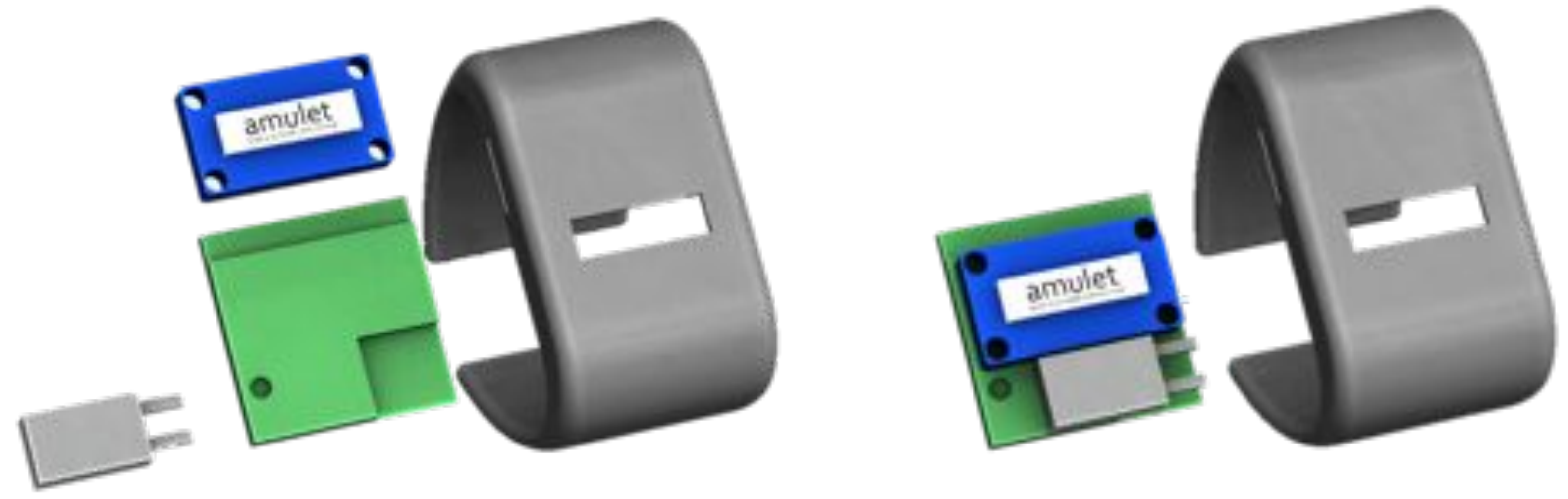
Many of the most compelling mHealth applications are designed to enable long-term health monitoring for outpatients with chronic medical conditions, for individuals seeking to change behavior, for physicians seeking to quantify and detect behavioral aberrations for early diagnosis, for home-care providers needing to track movements of elders under their care in order to respond quickly to emergencies, or for athletes monitoring their physiology to improve performance. Developing body-area health network (BAHN) applications that require consistent presence and strong security, without depending on a smartphone and without significantly increasing the computational/communication resource requirements of each individual BAHN device, presents a critical challenge for the widespread adoption of mHealth technologies.



- Sensors: 9-axis motion sensor
- Sensors: light, temp, sound
- ARM Cortex M4f for apps
- ARM Cortex M0 w/ANT radio



- SD card slot
- Output: OLED display
- Expansion pins
- Size: 3.7 cm x 3.5 cm



Envisioned user prototype

Developer prototype



### Amulet goals

To design a platform for mHealth applications that is:

- secure
- provides high availability
- allows for the deployment of multiple third-party applications that share resources in a body-area network

### Approach

High availability through ultra-low power architecture: A low-power wearable device can provide higher availability, remaining attached to the user during most activities.

### Software Architecture

<input type="checkbox"/> Services available to applications	<input checked="" type="checkbox"/> Privileged components	<input type="checkbox"/> Existing software/libs		
Event-driven application 1 as FSM	Event-driven application 2 as FSM	Event-driven application 3 as FSM		
Event processor and event-driven framework				
Sensor Manager	Actuator Manager	Storage Manager	Network Manager	
Inter-processor Communication Manager	Time Server	Crypto Service	Power Manager	Authorization Manager
Board Support				

Despite intense constraints on memory, computation, bandwidth, power, and size, we aim to provide a wide range of capabilities on the Amulet:

- Incorporate data-collection features to support our research, and (later) to support mHealth research.
- Secure mHealth applications and the integrity of data, by protecting the Amulet platform, and its apps, from other apps.
- Define access-control mechanisms that support variety of policies.
- Develop secure WBAN protocols for communication with body-area sensors.
- Invent usable methods for interacting with applications: intuitive interfaces for user input & output (such as gestures and haptics).
- Define methods for interacting with ambient devices (e.g., displays).
- Develop a framework for apps that require body-area sensing and actuation, to ease development for apps that integrate the amulet, one or more on-body or near-body devices, and optionally the smartphone and the cloud.
- Develop several applications, such as emergency responder; stress monitoring/management; smoking monitoring/cessation; diet (bite counting); physical therapy (knee sensor).



Find out more: [www.amulet-project.org](http://www.amulet-project.org)

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This research results from a research program supported by the National Science Foundation under award numbers CNS-1314281, CNS-1314342, and TC-0910842, and by the Department of Health and Human Services (SHARP program) under award number 90TR0003-01. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.